

From: [Karen Burgess](#)
To: [Burgess, Karen](#)
Subject: Fw: nutrients questions
Date: Thursday, May 18, 2017 8:21:18 AM
Attachments: [1A294738.gif](#)
[1A372925.gif](#)
[1A078590.jpg](#)
[1A018512.jpg](#)

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[Karen Burgess, P.E.](#)
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----- Forwarded by Karen Burgess/R10/USEPA/US on 05/18/2017 08:20 AM -----

From: "Kmet, Nancy (ECY)" <nkme461@ECY.WA.GOV>
To: "Ahmed, Anise (ECY)" <AAHM461@ECY.WA.GOV>, "Bailey, Patricia M. (ECY)" <pnor461@ECY.WA.GOV>, "Conaway, Kathy (ECY)" <KCON461@ECY.WA.GOV>, "Diamant, John (ECY)" <JDIA461@ECY.WA.GOV>, "Fricke, Laura R. (ECY)" <LFRI461@ECY.WA.GOV>, "Henley, Mark (ECY)" <MAHE461@ECY.WA.GOV>, "Herold, Mike (ECY)" <mher461@ECY.WA.GOV>, "Karen Burgess/R10/USEPA/US@EPA", "Kmet, Nancy (ECY)" <nkme461@ECY.WA.GOV>, "Leier, James W. (ECY)" <JALE461@ECY.WA.GOV>, "McGowan, Vincent (ECY)" <vmcg461@ECY.WA.GOV>, "Moore, Bill (ECY)" <BMOO461@ECY.WA.GOV>, "Nichols, Donald G. (ECY)" <DNIC461@ECY.WA.GOV>, "Nichols, Stacy (ECY)" <snic461@ecy.wa.gov>, "Wigfield, Kim (ECY)" <kand461@ECY.WA.GOV>, "Zentner, Greg (ECY)" <GZEN461@ECY.WA.GOV>,
Date: 12/21/2012 10:45 AM
Subject: FW: nutrients questions

I have had a fair number of questions from staff about the nutrient testing. Mindy Roberts provided some additional information and her recommendations about variability.

Please share this with staff we can discuss it at either the January PWG meeting or the March meeting. Our January agenda is already full.

[Nancy Kmet](#)
[360-407-6158](#)
nancy.kmet@ecy.wa.gov

From: Roberts, Mindy (ECY)
Sent: Thursday, December 20, 2012 9:10 AM
To: Kmet, Nancy (ECY); Lane, Tonya (ECY)
Cc: Erickson, Karol (ECY)
Subject: RE: nutrients questions

Nancy and Tonya – Here are my thoughts on the two emails I received on this, both pasted below. These are recommendations, so up to WQP to decide how to handle.

I understand that the facility Tonya manages has 5 years of data and Tonya posed several related questions:

- Is the variability in the data low? We do not have a numerical benchmark for what defines low, but we can develop one based on the information collected to date from the South Puget Sound DO Study and plant-specific monitoring. Maybe a project request to EAP? In lieu of that, I recommend taking the ratio of the interquartile range (75th minus 25th percentile concentrations), and divide it by the 50th percentile (median). If the ratio is <30 to 50%, then call it low variability. See below for a quick analysis I did on data from the SPS DO Study treatment plant data.
- Can the permit requirement be dropped from the next permit cycle? This is a WQP decision, and if we can work out what constitutes “low” then no need to make a plant-specific assessment. Until then, we can confer with you on the datasets your facilities gather.
- What types of phosphorus should be measured? Both total phosphorus and soluble reactive phosphorus are needed to characterize a facility’s discharge and potential impacts on receiving water bodies.
- Does phosphorus need to be included for marine discharges? Phosphorus should be measured as long as nitrogen is measured, or until we learn that there are no impacts from phosphorus.

I’ll be out of the office 12/25 – 1/2/13, but let me know if you would like to discuss any of this.

Mindy

Background on defining “low” variability:

In the South Sound DO study monitoring, we collected 3 to 15 effluent samples from 28 plants around South and Central Puget Sound. These were analyzed for nitrogen and phosphorus species. We analyzed the min/max values but focused more on the percentiles of the whole dataset to analyze the results.

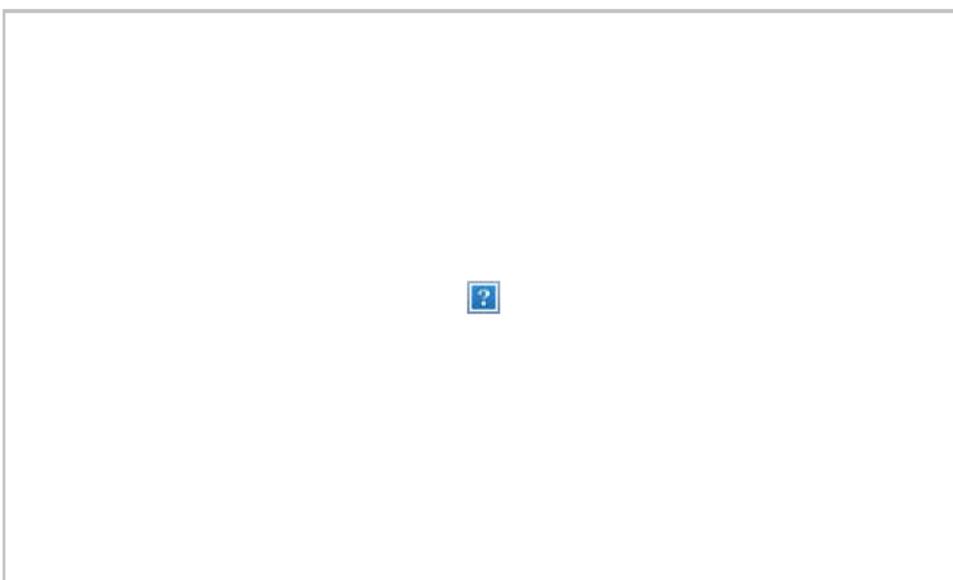
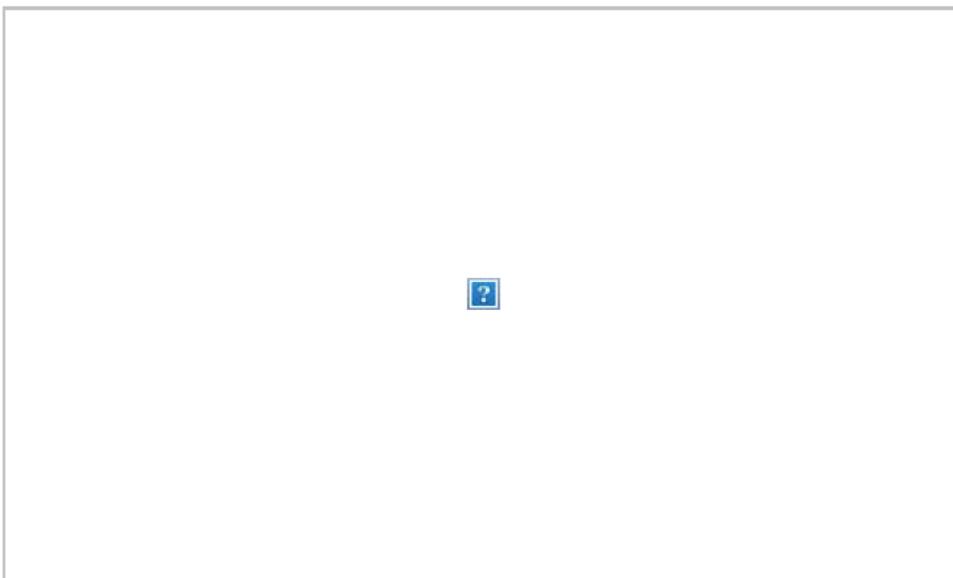
The median WWTP plant total nitrogen concentrations ranged from 3 to 53 mg/L, so over an order of magnitude range depending on which plant was sampled. Within any particular plant the range between the 75th and 25th percentiles was <2 mg/L for a few plants, most varied 3 to 10 mg/L, and one was >10 mg/L. Some plants had low ranges, others had high ranges.

For total phosphorus, the medians ranged from 0.1 to 10.4 mg/L among plants (two orders of magnitude), with about 2 mg/L within any particular plant (difference in the 75th and 25th percentiles). The between-plant phosphorus concentrations exhibited greater variability than within-plant concentrations, just as for nitrogen.

The plots below present the ratio between the interquartile range (75th-25th percentile concentrations) divided by the 50th percentile. If we define “low” variability as a ratio <0.30, then 17 out of 28 plants had low nitrogen variability and 15 out of 28 had low phosphorus variability. If we define “low” variability as a ratio <0.50, then 21 plants had low nitrogen variability and 20 plants had low phosphorus variability.

We presented box plots showing the median and interquartile range for the plants we monitored in South and Central Sound. See Figures G-1 to G-8 in publication 11-03-001 (<https://fortress.wa.gov/ecy/publications/SummaryPages/1103001.html>).

An EAP project could formalize these in discussion with WQP and could expand the data considered to any plant data collected under the requirement.



From: Lane, Tonya (ECY)
Sent: Tuesday, December 18, 2012 11:59 AM
To: Roberts, Mindy (ECY)
Subject: questions about nutrient monitoring

Hi Mindy,

Ecology permit writers are adding monthly or quarterly nutrients monitoring to many of our NPDES permits (which are on 5-yr cycles). I understand that Ecology can drop this monitoring requirement in cases where we have sufficient data and "low variability." Do you know if Ecology has a benchmark for what constitutes "low variability"? And in any case, if we can give EAP a full 5-yrs of nutrient data (60 data points or 20 data points, depending on monitoring frequency) from our treatment plants, can we simply eliminate the nutrients monitoring requirements

from the next permit cycle? Or does EAP need us to continue gathering the data indefinitely?

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Thanks for your time,

Tonya Lane | Municipal Facility Manager | Department of Ecology | Water Quality Program | Northwest Regional Office, 3190 160th Avenue SE, Bellevue, WA 98008-5452 | 425-649-7050 | tlan461@ecy.wa.gov

From: Kmet, Nancy (ECY)
Sent: Tuesday, December 18, 2012 8:58 AM
To: Lane, Tonya (ECY)
Cc: Roberts, Mindy (ECY)
Subject: RE: nutrients questions

I missed your second question. If a facility has 5 full years of data that is probably sufficient characterization but the cost for this sampling is cheap and you should take that into consideration.

You may want to discuss what is enough data for characterization with Mindy Roberts at EAP.

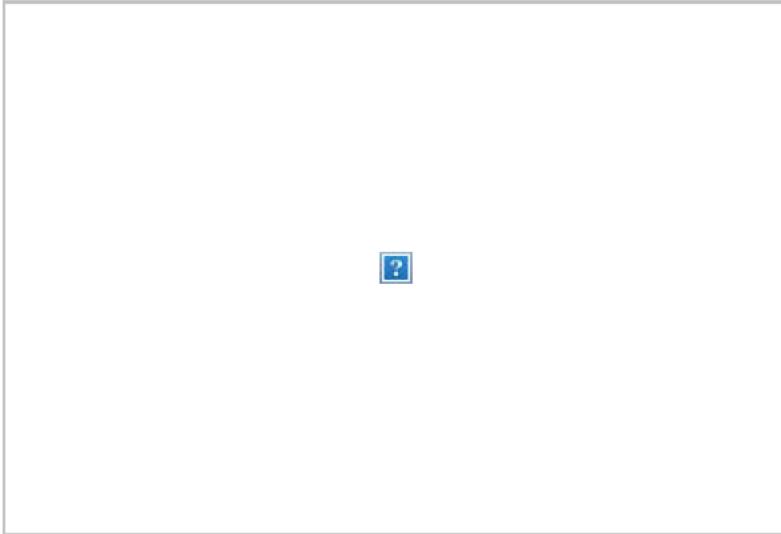
Nancy Kmet
360-407-6158
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From: Lane, Tonya (ECY)
Sent: Monday, December 17, 2012 4:57 PM
To: Kmet, Nancy (ECY)
Subject: nutrients questions

Hi Nancy,

The snapshot below is of the nutrients monitoring frequencies required by Ecology's latest NPDES permit shell (June

2012 version). There are two types of phosphorus monitoring listed. I'd heard there was a discussion about eliminating total phosphorus if we're also monitoring for soluble reactive phosphorus. Can you confirm that we're still supposed to require both forms, even of marine discharges?



Also, the entire suite of expanded nutrients monitoring is typically being required for a full 5-yr permit term at the above frequencies. The shell says we can drop the expanded nutrients monitoring in cases where we have sufficient data and "low variability"... Do we have a specific benchmark for what constitutes "low variability", and if we get a full 5-yrs of nutrient data and can meet this "low variability" test, can we simply eliminate the requirement from the next permit cycle even if the facility hasn't made a special request?

Thanks for your time -

Tonya Lane | Municipal Facility Manager | Department of Ecology | Water Quality Program | Northwest Regional Office, 3190 160th Avenue SE, Bellevue, WA 98008-5452 | 425-649-7050 | tlan461@ecy.wa.gov

Additional wastewater discharge records may be available online at the Ecology Water Quality Program database, the Permitting and Reporting Information System ([PARIS](#)).